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Research Article

DEVELOPMENT OF A CLINICAL DIAGNOSTIC PARAMETER FOR DIAGNOSIS OF LUMBOSACRAL DISC PROLAPSE WITH RESPECT TO THE TENDER POINT BASED ON MRI AND CT SCAN FINDINGS

Begum Masuma[1]*, Baishya Anup[2], Sarma Tikendrajit[3]

*[1]PG Scholar, [2]Professor and Head of the Department, Department of Roga Nidan, [3]Professor, Department of Sharir Rachana, Government Ayurvedic College and Hospital, Guwahati, Assam, India.

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ABSTRACT

A quite common, painful disorder of the spine is Intervertebral Disc Prolapse (IVDP). Usually, pain is brought on either by repetitive twisting, bending, or heavy lifting. The pain starts in the lower back mainly the lumbosacral region because of its mobility and radiates to the gluteal region and posterior thigh. Clinical assessment and imaging studies are used now-a-days to evaluate the patient's symptoms. Magnetic Resonance Imaging (MRI) and CT scanning employed to identify the etiological factors and determine the level of the anatomical abnormality in spinal diseases. But MRI scan is considered to be one of the expensive tests in radiological diagnostics, due to which economically weaker patients are unable to afford it and suffer throughout their life with pain due to lack of proper diagnosis and treatment. So, in this research work tender point of lower back have been identified. The relationship between the radiological findings and tender point is found statistically highly significant.

INTRODUCTION

The human spine is the self-sustained structure of strong muscles and bones, flexible tendons and ligaments and sensitive nerves. As the spine controls body vital functions, it is absolutely necessary to keep spine healthy but due to the modernization of our lifestyle, now-a-days spinal diseases especially cervical and lumbar disc diseases are increasing day by day and if not treated early it will lead to so many serious complications[1].

Among all the spinal diseases low back pain is a very common health problem worldwide which may be due to intervertebral disc prolapse (IVDP), spondylosis, spondylolisthesis, injury or other degenerative conditions of spine. Low back pain is the most prevalent health problem worldwide and a major cause of disability. Though several risk factors have been identified (including occupational posture, obesity, body height and weight, age, depression), the causes of the onset of low back pain remain obscure and difficult to diagnose. Low back pain is not a disease but a constellation of symptoms. In most cases, the cause remains unknown. Among different factors, the degenerative disc disease and lumbar disc herniation are the most common causes for low back pain[2].

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AIM AND OBJECTIVE

The aim of the present study is to develop a clinical diagnostic parameter for diagnosis of lumbosacral disc prolapse with the help of radiological investigations like MRI and CT scan.

Purpose of the study

MRI is expensive. So, an attempt has been made to develop a clinical diagnostic parameter, so that in future we can diagnose and treat the patient of lumbosacral disc prolapse without any radiological findings. So, it will reduce the economic burden of the patient.

MATERIALS AND METHODS

Diagnosed cases of lumbosacral disc prolapse were selected to develop clinical diagnostic parameter with the help of radiological findings.

Sample size

For clinical study 100 diagnosed cases of lumbosacral disc prolapse were selected, among which 28 cases were found to have localized tenderness. So, 28 patients among 100 were selected for the purpose of development of diagnostic parameter for Lumbosacral disc prolapse.

Selection of Patients

All the patients were randomly selected from Out-Patient Department and In-Patient Department of Government Ayurvedic College and Hospital, Guwahati, Assam.

Study Design

Among the 100 patients, 28 patients of lumbosacral disc prolapse with localized tender point were registered for development of diagnostic parameter.

a. Surface anatomy of the lower back region has been studied to identify the symptoms of lumbosacral disc prolapse.
b. A graph was prepared with 2 paravertebral lines drawn on both side of midline (vertebrae) and named as Y axis on left and Y$^{|}$ axis on right (paravertebral line is a vertical line corresponding to the tips of the transverse processes of vertebrae).
c. 1 sacroiliac line was drawn named –X axis on left extending to X axis on right side of midline.
d. The portion below sacroiliac line was considered as –Y and –Y$^{|}$ axis.
e. Parallel lines were drawn to paravertebral and Sacroiliac line, where distance between each line will be ½ inch.
f. Tender zone of the particular patient was marked and measuring tape was used to measure the area of the tender point from the mid vertebral line.
g. The point was noted on the graph printed on tracing paper.
h. The radiological findings were recorded for each patient and correlated with the tender point.
i. All the lumbosacral disc prolapse patients were studied with the help of subjective and objective parameters.

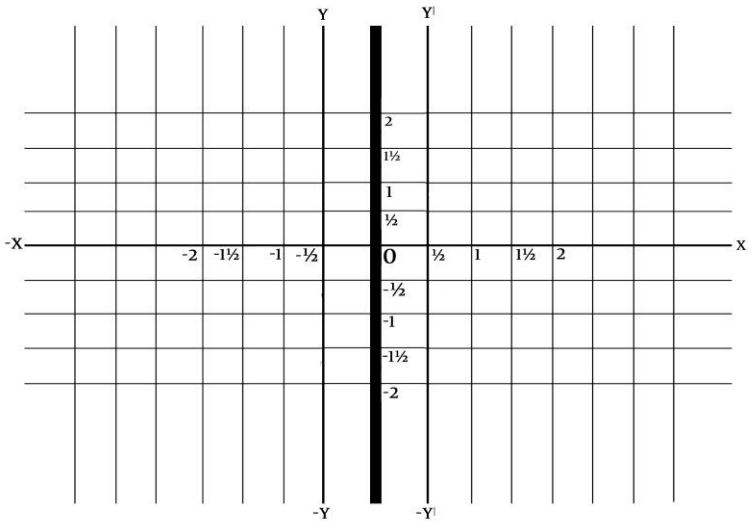

Figure 1: Tender point plotted in graph

Inclusion criteria

- Patients in the age group of 30-60 years.
- All the diagnosed and selected patients of lumbosacral disc prolapse.
- Fresh cases or recurred cases.

Exclusion criteria

- Other than IVDP of LS spine, other diseases are excluded.

OBSERVATION AND RESULTS

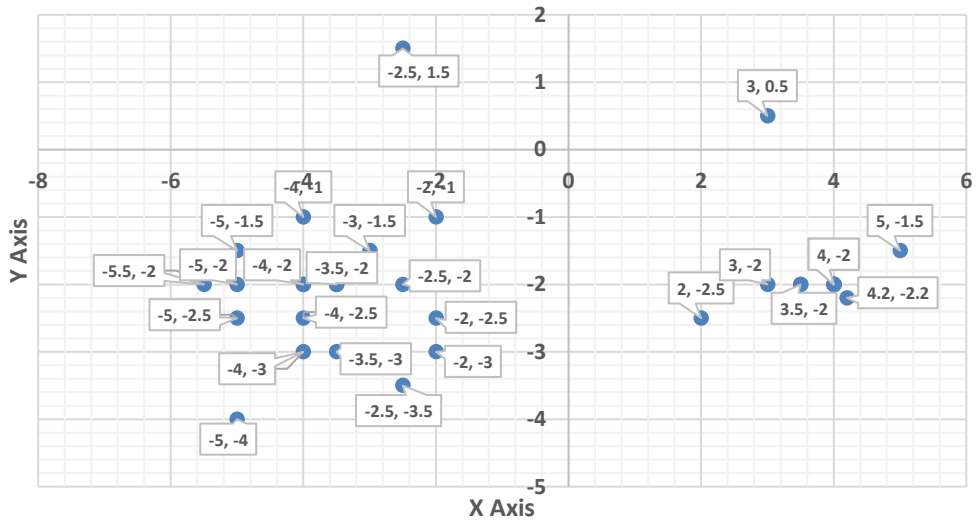

Figure 2: All the tender points of the patient

In figure 2, it was found that maximum number of patients i.e., 19 patients show tender zone in 3rd quadrant, 11 patients show in 4th quadrant, 1 patient in 1st quadrant and 1 patient in 2nd quadrant.

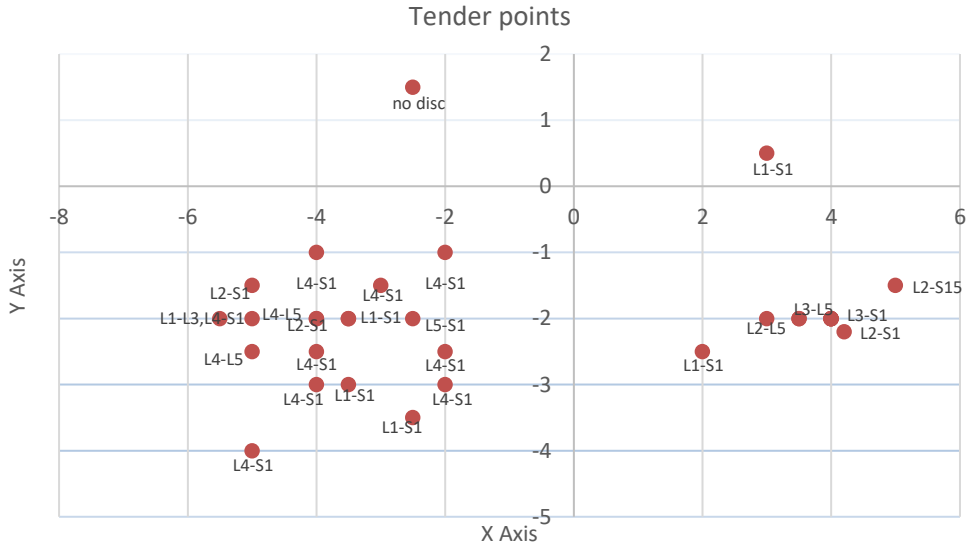

Figure 3: Tender points versus disc prolapse of particular patients

In figure 3, it was found that maximum number of patients shows tender point versus disc prolapse i.e., in the 3rd quadrant out of 19 patients, 10 patients with L4-S1 disc prolapse i.e., maximum patients with 2 disc involvement. Then 3 patients show L1-S1 disc prolapse i.e. 5 disc involvement, 2 patients show L2-S1 disc prolapse i.e., 4 disc involvement.

The 4th quadrant shows maximum number of patients with tender point versus disc prolapse i.e., 3 patients with 3 disc involvement i.e., L3-S1 disc prolapse, 2 patients show 4 disc involvement i.e., L2-S1 disc level, 2 patients show 1 disc involvement i.e., L4-L5 disc prolapse.

DISCUSSION

Tender points of all the patients

Maximum number of patients i.e., 19 patients show tender point in 3rd quadrant, 11 patients show in 4th quadrant, 1 patient in 1st quadrant and 1 patient in 2nd quadrant.

Tender points versus disc prolapse of particular patients

- Maximum number of patients shows tender point versus disc prolapse i.e. in the 3rd quadrant out of 19 patients, 10 patients with L4-S1 disc prolapse i.e., maximum patients with 2 disc involvement. Then 3 patients show L1-S1 disc prolapse i.e., 5 disc involvement, 2 patients show L2-S1 disc

prolapse i.e., 4 disc involvement, 1 patient show L1-L3 disc prolapse i.e., 2 disc involvement, 1 patient L3-S1, 1 patient show L5-S1 disc prolapse. 1 patient show L3-S1 disc prolapse i.e., 2 disc involvement, 2 patients show L4-L5 disc prolapse i.e. 1 disc involvement and 1 patient show L5-S1 disc prolapse i.e. 1 disc involvement.

- The 4thquadrant shows patients with tender point versus disc prolapse i.e. 3 patients with 3 disc involvement i.e. L3-S1 disc prolapse, 2 patients show 4 disc involvement i.e. L2-S1 disc level, 2 patients show 1 disc involvement i.e. L4-L5 disc prolapse, 1 patient show 5 disc involvement i.e. L1-S1 disc, 1 patient show 3 disc involvement i.e. L2-L5 disc, 1 patient show 2 disc involvement i.e. L3-L5 disc and 1 patient show 2 disc involvement i.e. L4-S1 disc.
- The 2nd quadrant shows 1 patient with tender point with no disc involvement and 1st quadrant show 1 tender point with 5 disc involvement i.e. L1-S1 disc prolapse.

Surface anatomical aspect of tender point

For Paravertebral line:

n = 28

Y = 63.2 inch

Mean = 2.26 inch i.e. 5.74cm

SD = ± 0.72 inch i.e. 1.82cm

Among all 28 patients, in relation to paravertebral line surface anatomical aspect shows tender point 5.74cm (±1.82cm) distance away from paravertebral line.

Surface anatomical aspect of tender point in relation to disc involvement

- For Sacroiliac line

  n = 10

  X = 35.5 inch

  Mean = 3.55 inch i.e. 9.02 cm

  SD = (±1.19) inch i.e. 3.02 cm
- For Paravertebral line

  n = 10

  Y = 22.5 inch

  Mean = 2.25 inch i.e. 5.72 cm

  SD = (±1.09) inch i.e. 2.76 cm
- So, when there is L4-L5 and L5-S1 disc involvement, the tender point is seen 9.02cm (±3.02cm) below sacroiliac line and 5.72cm (±2.76cm) away from paravertebral line in 3rd quadrant i.e., the left gluteal region.

CONCLUSION

It can be concluded that, out of 100 patients, 28 patients elicited tender point where maximum is found in 3rd quadrant (left gluteal region), below sacroiliac line i.e., 19 patients.

1. Among all 28 patients, in relation to paravertebral line surface anatomical aspect shows tender point 5.74cm (±1.82cm) distance away from paravertebral line.
2. Based on disc involvement, out of 28 patients, maximum number of patients i.e., 10 patients show tender point where L4-L5 and L5-S1 disc involvement is seen.
3. We can conclude that when there is L4-L5 and L5-S1 disc involvement, the tender point is seen 9.02cm (±3.02cm) below sacroiliac line and 5.72cm (±1.09cm) away from paravertebral line in 3rd quadrant i.e. the left gluteal region.

Scope of the study

The surface anatomical landmark in the study shows tender point in Intervertebral Disc Prolapse (IVDP) cases, positive findings found in both paravertebral and sacroiliac line. Yet, larger sample stabilize the result.

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***Address for correspondence**
Dr. Begum Masuma
PG Scholar,
Department of Roga Nidan,
Government Ayurvedic College and Hospital, Guwahati, Assam.
Email:
masumabegum533@gmail.com

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